SEQUENCE LISTING

<110> Innovations Foundation

<120> Secreted Acid Phosphatase (sapM) is Present Only in Pathogenic Mycobacteria and Expressed Selectively at Phagosomal pH

<130> 4146 0005

<140>

<141>

<150> US 60/416,957

<151> 2002-10-09

<160> 22

<170> PatentIn version 3.0

<210> 1

<211> 500

<212> DNA

<213> Mycobacterium tuberculosis

<400> 1
catcgggtca agcaccatga ccggtacatc cgtcaggtcg tcgggcagcg agtccagata 60

cggcaccggc tggtgggttt gctcgtcgcg ggcgacaccg acaaagccaa cgtgcgcctc 120

cggcaaggcg gcatgcgcct cgtcgaccat ccccaacccc gcccgcaaca caggaaccag 180

caggggtggc ttggttagcc gcgacccgac cgtctcggcc agcggcgtac ggatcgggac 240

tggctcgcag ggcgcatcgc gggtggcctc atagatcaac agcagcgtga gctcgcgcag 300

cgctgcccgg aagccggcgt tgtcggtgcg ttcgtcacgc agcgtggtca gtcgggccgc 360

ggccagtggg tggtcaacga catggacctg cacggcgttg aaccctatat aacaatcgtg 420

gctcggtccc ctaaaagggg gctgatacgg gtgcgtccat ccgcgcgacc ggtcaacccc 480

gtccatatac tcccggcatg 500

<210> 2

<211> 500

<212> DNA

<213> Mycobacterium bovis

<400> 2
catcgggtca agcaccatga ccggtacatc cgtcaggtcg tcgggcagcg agtccagata 60

cggcaccggc tggtgggttt gctcgtcgcg ggcgacaccg acaaagccaa cgtgcgcctc 120

cggcaaggcg gcatgcgcct cgtcgaccat ccccaacccc gcccgcaaca caggaaccag 180

caggggtggc ttggttagcc gcgacccgac cgtctcggcc agcggcgtac ggatcgggac 240

tggctcgcag ggcgcatcgc gggtggcctc atagatcaac agcagcgtga gctcgcgcag 300

cgctgcccgg aagccggcgt tgtcggtgcg ttcgtcacgc agcgtggtca gtcgggccgc 360

ggccagtggg tggtcaacga catggacctg cacggcgttg aaccctatat aacaatcgtg 420

gctcggtccc ctaaaagggg gctgatacgg gtgcgtccat ccgcgcgacc ggtcaacccc 480

gtccatatac tcccggcatg 500

<210> 3

<211> 500

<212> DNA

<213> Mycobacterium avium

<400> 3

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cgccgccaaa tacgggaccg gccggtgggt ttgctcgtcg cgggcgacgc cgacgaagcc 120

cacctcggcc tcgggcagcg cggcctgcgc cgggtcgacc atgcccagcc cggcgcgcag 180

caccggaacc agcagcggcg gattgaccag tcgggtcccg gcggccgcgg ccaccggggt 240

gcggatccgg accgacttgc gcggcgcgtc gcggctggcc tcgtagacca gcatcagcgt 300

cagatcgcgc agcgcggccc gaaatccggc ggtgtcggtg cgttcgtcgc gcagcaccgt 360

cagccgggcc gcggccaacg ggtggtcgat cacgcacacg tccatctggt cgagggtata 420

taacgatcgg gcaaagcccc gctgacacgc ttgcccgccg gccggaaacg ccttaccgcc 480

gttcgtatac tccgggcgtg 500

<210> 4

<211> 500

<212> DNA

<213> Mycobacterium marinum

<400> 4

cgccggtggc cagcatcggg tccagcacca ttacgggtag cccggacaag tcgtcgggca 60

gcgattcaag atatgggacg ggctggtggg tctgctcatt gcgggcgata ccgacaaagc 120

cgacccgcgc ctccggcagc gccgcatgcg cttcgtcgac catgcccagt ccggcgcgca 180

gcaccggaac cagaagcggg gggttggcca gtcttaggcc tgtcgtggcc gcaagcggtg 240

tacggatagc gacggattcg gtgggcgctg cgcgggtcgc ctcatagacc agtaccagtg 300

tcagctcacg caaggccttg cggaaagcag cgtttccggt gcgttcgtca cgcagcgcgg 360

tcaggcgggc cgccgccagc gggtgatcaa tgacgtggac ttccacatgg gtgaccctat 420

ataacaatcg gattcaagcc gctgacacgc tccccctcct cgcggcgccg aggccgagcc 480

gcccatatac tccgggcgtg 500

<210> 5

<211> 43

<212> PRT

<213> Mycobacterium tuberculosis

<400> 5

Met Leu Arg Gly Ile Gln Ala Leu Ser Arg Pro Leu Thr Arg Val Tyr
1 5 10 15

Arg Ala Leu Ala Val Ile Gly Val Leu Ala Ala Ser Leu Leu Ala Ser
20 25 30

Trp Val Gly Ala Val Pro Gln Val Gly Leu Ala
35 40

<210> 6

<211> 43

<212> PRT

<213> Mycobacterium bovis

<400> 6

Met Leu Arg Gly Ile Gln Ala Leu Ser Arg Pro Leu Thr Arg Val Tyr
1 5 10 15

Arg Ala Leu Ala Val Ile Gly Val Leu Ala Ala Ser Leu Leu Ala Ser
20 25 30

Trp Val Gly Ala Val Pro Gln Val Gly Leu Ala
35 40

<210> 7

<211> 42

<212> PRT

<213> Mycobacterium avium

<400> 7

Met Ser Arg Glu Asn Arg Ser Arg Arg Arg Leu Ile Gly Gly Ala Tyr
1 5 10 15

Arg Ser Leu Arg Leu Leu Gly Ala Val Ala Ala Val Ala Leu Ala Ala
20 25 30

Ser Pro Leu Thr Pro Arg Thr Ser Leu Ala
35 40

<210> 8

<211> 40

<212> PRT

<213> Mycobacterium marinum

<400> 8

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Met Cys Gly Leu Lys Gln Arg Phe Thr Ser Thr Phe Arg Ala Leu Ala
1               5                   10                  15

Val Leu Gly Ala Val Ala Val Ser Leu Pro Ala His Gly Ser Asp Ala
            20                  25                  30

Pro Pro Arg Ile Asp Leu Thr Ala
        35                  40
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<210> 9

<211> 900

<212> DNA

<213> Mycobacterium tuberculosis

<220>

<221> CDS

<222> (1)..(900)

<400> 9

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atg ctc cgc gga atc cag gct ctc agc cgg ccc ctg acc agg gta tac       48
Met Leu Arg Gly Ile Gln Ala Leu Ser Arg Pro Leu Thr Arg Val Tyr
1               5                   10                  15

cgt gcc ttg gcg gtg atc ggt gtc ctg gca gca tcg ttg ctg gcc tca       96
Arg Ala Leu Ala Val Ile Gly Val Leu Ala Ala Ser Leu Leu Ala Ser
            20                  25                  30

tgg gtc ggc gct gtc cca caa gtg ggt ctg gca gcg agt gcc ctg ccg      144
Trp Val Gly Ala Val Pro Gln Val Gly Leu Ala Ala Ser Ala Leu Pro
        35                  40                  45

acc ttc gcg cac gtg gtc atc gtg gtg gag gag aac cgc tcg cag gcc      192
Thr Phe Ala His Val Val Ile Val Val Glu Glu Asn Arg Ser Gln Ala
    50                  55                  60

gcc atc atc ggt aac aag tcg gct ccc ttc atc aat tcg ctg gcc gcc      240
Ala Ile Ile Gly Asn Lys Ser Ala Pro Phe Ile Asn Ser Leu Ala Ala
65                  70                  75                  80

aac ggc gcg atg atg gcc cag gcg ttc gcc gaa aca cac ccg agc gaa      288
Asn Gly Ala Met Met Ala Gln Ala Phe Ala Glu Thr His Pro Ser Glu
                85                  90                  95

ccg aac tac ctg gca ctg ttc gct ggc aac aca ttc ggg ttg acg aag      336
Pro Asn Tyr Leu Ala Leu Phe Ala Gly Asn Thr Phe Gly Leu Thr Lys
            100                 105                 110

aac acc tgc ccc gtc aac ggc ggc gcg ctg ccc aac ctg ggt tct gag      384
Asn Thr Cys Pro Val Asn Gly Gly Ala Leu Pro Asn Leu Gly Ser Glu
        115                 120                 125
```

```
ttg ctc agc gcc ggt tac aca ttc atg ggg ttc gcc gaa gac ttg cct      432
Leu Leu Ser Ala Gly Tyr Thr Phe Met Gly Phe Ala Glu Asp Leu Pro
    130                 135                 140

gcg gtc ggc tcc acg gtg tgc agt gcg ggc aaa tac gca cgc aaa cac      480
Ala Val Gly Ser Thr Val Cys Ser Ala Gly Lys Tyr Ala Arg Lys His
145                 150                 155                 160

gtg ccg tgg gtc aac ttc agt aac gtg ccg acg aca ctg tcg gtg ccg      528
Val Pro Trp Val Asn Phe Ser Asn Val Pro Thr Thr Leu Ser Val Pro
                165                 170                 175

ttt tcg gca ttt ccg aag ccg cag aat tac ccc ggc ctg ccg acg gtg      576
Phe Ser Ala Phe Pro Lys Pro Gln Asn Tyr Pro Gly Leu Pro Thr Val
            180                 185                 190

tcg ttt gtc atc cct aac gcc gac aac gac atg cac gac ggc tcg atc      624
Ser Phe Val Ile Pro Asn Ala Asp Asn Asp Met His Asp Gly Ser Ile
        195                 200                 205

gcc caa ggc gac gcc tgg ctg aac cgc cac ctg tcg gca tat gcc aac      672
Ala Gln Gly Asp Ala Trp Leu Asn Arg His Leu Ser Ala Tyr Ala Asn
    210                 215                 220

tgg gcc aag aca aac aac agc ctg ctc gtt gtg acc tgg gac gaa gac      720
Trp Ala Lys Thr Asn Asn Ser Leu Leu Val Val Thr Trp Asp Glu Asp
225                 230                 235                 240

gac ggc agc agc cgc aat cag atc ccg acg gtg ttc tac ggc gcg cac      768
Asp Gly Ser Ser Arg Asn Gln Ile Pro Thr Val Phe Tyr Gly Ala His
                245                 250                 255

gtg cgg ccc gga act tac aac gag acc atc agc cac tac aac gtg ctg      816
Val Arg Pro Gly Thr Tyr Asn Glu Thr Ile Ser His Tyr Asn Val Leu
            260                 265                 270

tcc aca ttg gag cag atc tac gga ctg ccc aag acg ggt tat gcg acc      864
Ser Thr Leu Glu Gln Ile Tyr Gly Leu Pro Lys Thr Gly Tyr Ala Thr
        275                 280                 285

aat gct ccg cca ata acc gat att tgg ggc gac tag                      900
Asn Ala Pro Pro Ile Thr Asp Ile Trp Gly Asp
    290                 295
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<210> 10

<211> 299

<212> PRT

<213> Mycobacterium tuberculosis

<400> 10

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Met Leu Arg Gly Ile Gln Ala Leu Ser Arg Pro Leu Thr Arg Val Tyr
1               5                   10                  15

Arg Ala Leu Ala Val Ile Gly Val Leu Ala Ala Ser Leu Leu Ala Ser
            20                  25                  30

Trp Val Gly Ala Val Pro Gln Val Gly Leu Ala Ala Ser Ala Leu Pro
        35                  40                  45
```

```
Thr Phe Ala His Val Val Ile Val Val Glu Glu Asn Arg Ser Gln Ala
    50                  55                  60

Ala Ile Ile Gly Asn Lys Ser Ala Pro Phe Ile Asn Ser Leu Ala Ala
65                  70                  75                  80

Asn Gly Ala Met Met Ala Gln Ala Phe Ala Glu Thr His Pro Ser Glu
                85                  90                  95

Pro Asn Tyr Leu Ala Leu Phe Ala Gly Asn Thr Phe Gly Leu Thr Lys
            100                 105                 110

Asn Thr Cys Pro Val Asn Gly Gly Ala Leu Pro Asn Leu Gly Ser Glu
        115                 120                 125

Leu Leu Ser Ala Gly Tyr Thr Phe Met Gly Phe Ala Glu Asp Leu Pro
    130                 135                 140

Ala Val Gly Ser Thr Val Cys Ser Ala Gly Lys Tyr Ala Arg Lys His
145                 150                 155                 160

Val Pro Trp Val Asn Phe Ser Asn Val Pro Thr Thr Leu Ser Val Pro
                165                 170                 175

Phe Ser Ala Phe Pro Lys Pro Gln Asn Tyr Pro Gly Leu Pro Thr Val
            180                 185                 190

Ser Phe Val Ile Pro Asn Ala Asp Asn Asp Met His Asp Gly Ser Ile
        195                 200                 205

Ala Gln Gly Asp Ala Trp Leu Asn Arg His Leu Ser Ala Tyr Ala Asn
    210                 215                 220

Trp Ala Lys Thr Asn Asn Ser Leu Leu Val Val Thr Trp Asp Glu Asp
225                 230                 235                 240

Asp Gly Ser Ser Arg Asn Gln Ile Pro Thr Val Phe Tyr Gly Ala His
                245                 250                 255

Val Arg Pro Gly Thr Tyr Asn Glu Thr Ile Ser His Tyr Asn Val Leu
            260                 265                 270

Ser Thr Leu Glu Gln Ile Tyr Gly Leu Pro Lys Thr Gly Tyr Ala Thr
        275                 280                 285

Asn Ala Pro Pro Ile Thr Asp Ile Trp Gly Asp
    290                 295
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<210> 11

<211> 900

<212> DNA

<213> Mycobacterium bovis

<220>

<221> CDS

<222> (1)..(900)

<400> 11

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atg ctc cgc gga atc cag gct ctc agc cgg ccc ctg acc agg gta tac       48
Met Leu Arg Gly Ile Gln Ala Leu Ser Arg Pro Leu Thr Arg Val Tyr
1               5                  10                  15

cgt gcc ttg gcg gtg atc ggt gtc ctg gca gca tcg ttg ctg gcc tca       96
Arg Ala Leu Ala Val Ile Gly Val Leu Ala Ala Ser Leu Leu Ala Ser
            20                  25                  30

tgg gtc ggc gct gtc cca caa gtg ggt ctg gca gcg agt gcc ctg ccg      144
Trp Val Gly Ala Val Pro Gln Val Gly Leu Ala Ala Ser Ala Leu Pro
        35                  40                  45

acc ttc gcg cac gtg gtc atc gtg gtg gag gag aac cgc tcg cag gcc      192
Thr Phe Ala His Val Val Ile Val Val Glu Glu Asn Arg Ser Gln Ala
    50                  55                  60

gcc atc atc ggt aac aag tcg gct ccc ttc atc aat tcg ctg gcc gcc      240
Ala Ile Ile Gly Asn Lys Ser Ala Pro Phe Ile Asn Ser Leu Ala Ala
65                  70                  75                  80

aac ggc gcg atg atg gcc cag gcg ttc gcc gaa aca cac ccg agc gaa      288
Asn Gly Ala Met Met Ala Gln Ala Phe Ala Glu Thr His Pro Ser Glu
                85                  90                  95

ccg aac tac ctg gca ctg ttc gct ggc aac aca ttc ggg ttg acg aag      336
Pro Asn Tyr Leu Ala Leu Phe Ala Gly Asn Thr Phe Gly Leu Thr Lys
            100                 105                 110

aac acc tgc ccc gtc aac ggc ggc gcg ctg ccc aac ctg ggt tct gag      384
Asn Thr Cys Pro Val Asn Gly Gly Ala Leu Pro Asn Leu Gly Ser Glu
        115                 120                 125

ttg ctc agc gcc ggt tac aca ttc atg ggg ttc gcc gaa gac ttg cct      432
Leu Leu Ser Ala Gly Tyr Thr Phe Met Gly Phe Ala Glu Asp Leu Pro
    130                 135                 140

gcg gtc ggc tcc acg gtg tgc agt gcg ggc aaa tac gca cgc aaa cac      480
Ala Val Gly Ser Thr Val Cys Ser Ala Gly Lys Tyr Ala Arg Lys His
145                 150                 155                 160

gtg ccg tgg gtc aac ttc agt aac gtg ccg gcg aca ctg tcg gtg ccg      528
Val Pro Trp Val Asn Phe Ser Asn Val Pro Ala Thr Leu Ser Val Pro
                165                 170                 175

ttt tcg gca ttt ccg aag ccg cag aat tac ccc ggc ctg ccg acg gtg      576
Phe Ser Ala Phe Pro Lys Pro Gln Asn Tyr Pro Gly Leu Pro Thr Val
            180                 185                 190

tcg ttt gtc atc cct aac gcc gac aac gac atg cac gac ggc tcg atc      624
Ser Phe Val Ile Pro Asn Ala Asp Asn Asp Met His Asp Gly Ser Ile
        195                 200                 205

gcc caa ggc gac gcc tgg ctg aac cgc cac ctg tcg gca tat gcc aac      672
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```
Ala Gln Gly Asp Ala Trp Leu Asn Arg His Leu Ser Ala Tyr Ala Asn
    210                 215                 220

tgg gcc aag aca aac aac agc ctg ctc gtt gtg acc tgg gac gaa gac      720
Trp Ala Lys Thr Asn Asn Ser Leu Leu Val Val Thr Trp Asp Glu Asp
225                 230                 235                 240

gac ggc agc agc cgc aat cag atc ccg acg gtg ttc tac ggc gcg cac      768
Asp Gly Ser Ser Arg Asn Gln Ile Pro Thr Val Phe Tyr Gly Ala His
                245                 250                 255

gtg cgg ccc gga act tac aac gag acc atc agc cac tac aac gtg ctg      816
Val Arg Pro Gly Thr Tyr Asn Glu Thr Ile Ser His Tyr Asn Val Leu
            260                 265                 270

tcc aca ttg gag cag atc tac gga ctg ccc aag acg ggt tat gcg acc      864
Ser Thr Leu Glu Gln Ile Tyr Gly Leu Pro Lys Thr Gly Tyr Ala Thr
        275                 280                 285

aat gct ccg cca ata acc gat att tgg ggc gac tag                     900
Asn Ala Pro Pro Ile Thr Asp Ile Trp Gly Asp
    290                 295
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<210> 12

<211> 299

<212> PRT

<213> Mycobacterium bovis

<400> 12

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Met Leu Arg Gly Ile Gln Ala Leu Ser Arg Pro Leu Thr Arg Val Tyr
1               5                   10                  15

Arg Ala Leu Ala Val Ile Gly Val Leu Ala Ala Ser Leu Leu Ala Ser
            20                  25                  30

Trp Val Gly Ala Val Pro Gln Val Gly Leu Ala Ala Ser Ala Leu Pro
        35                  40                  45

Thr Phe Ala His Val Val Ile Val Val Glu Glu Asn Arg Ser Gln Ala
    50                  55                  60

Ala Ile Ile Gly Asn Lys Ser Ala Pro Phe Ile Asn Ser Leu Ala Ala
65                  70                  75                  80

Asn Gly Ala Met Met Ala Gln Ala Phe Ala Glu Thr His Pro Ser Glu
                85                  90                  95

Pro Asn Tyr Leu Ala Leu Phe Ala Gly Asn Thr Phe Gly Leu Thr Lys
            100                 105                 110

Asn Thr Cys Pro Val Asn Gly Gly Ala Leu Pro Asn Leu Gly Ser Glu
        115                 120                 125

Leu Leu Ser Ala Gly Tyr Thr Phe Met Gly Phe Ala Glu Asp Leu Pro
```

130 135 140

Ala Val Gly Ser Thr Val Cys Ser Ala Gly Lys Tyr Ala Arg Lys His
145 150 155 160

Val Pro Trp Val Asn Phe Ser Asn Val Pro Ala Thr Leu Ser Val Pro
165 170 175

Phe Ser Ala Phe Pro Lys Pro Gln Asn Tyr Pro Gly Leu Pro Thr Val
180 185 190

Ser Phe Val Ile Pro Asn Ala Asp Asn Asp Met His Asp Gly Ser Ile
195 200 205

Ala Gln Gly Asp Ala Trp Leu Asn Arg His Leu Ser Ala Tyr Ala Asn
210 215 220

Trp Ala Lys Thr Asn Asn Ser Leu Leu Val Val Thr Trp Asp Glu Asp
225 230 235 240

Asp Gly Ser Ser Arg Asn Gln Ile Pro Thr Val Phe Tyr Gly Ala His
245 250 255

Val Arg Pro Gly Thr Tyr Asn Glu Thr Ile Ser His Tyr Asn Val Leu
260 265 270

Ser Thr Leu Glu Gln Ile Tyr Gly Leu Pro Lys Thr Gly Tyr Ala Thr
275 280 285

Asn Ala Pro Pro Ile Thr Asp Ile Trp Gly Asp
290 295

<210> 13

<211> 903

<212> DNA

<213> Mycobacterium avium

<220>

<221> CDS

<222> (1)..(903)

<400> 13

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Met Ser Arg Glu Asn Arg Ser Arg Arg Arg Leu Ile Gly Gly Ala Tyr
1 5 10 15

cga agc ctg cgg ctg ctc ggc gcc gtg gcc gcg gtg gcg ctg gcg gcc 96
Arg Ser Leu Arg Leu Leu Gly Ala Val Ala Ala Val Ala Leu Ala Ala
20 25 30

```
agc ccg ttg aca ccg cgc acc agc ctt gcg gca gcg gcc att ccg caa      144
Ser Pro Leu Thr Pro Arg Thr Ser Leu Ala Ala Ala Ala Ile Pro Gln
        35                  40                  45

ccg tcg cac atc gtg atc gtg gtg gag gaa aac cgt tcc gag agc ggc      192
Pro Ser His Ile Val Ile Val Val Glu Glu Asn Arg Ser Glu Ser Gly
    50                  55                  60

atc atc ggc aac aag tcg gcg ccc ttc atc acc gcg ctg gcc gcg tcc      240
Ile Ile Gly Asn Lys Ser Ala Pro Phe Ile Thr Ala Leu Ala Ala Ser
65                  70                  75                  80

ggc gcc aac atg acc cag tcg ttc gcc gaa acc cac ccc agc gag ccc      288
Gly Ala Asn Met Thr Gln Ser Phe Ala Glu Thr His Pro Ser Glu Pro
                85                  90                  95

aat tac ctg gcg ctg ttc gcc ggc aac acg ttc ggg gtg acc aag gac      336
Asn Tyr Leu Ala Leu Phe Ala Gly Asn Thr Phe Gly Val Thr Lys Asp
            100                 105                 110

ctg tgc ccg gtc aac gcc ggc gcc gca ccc aac ctg ggg tcc gaa ttg      384
Leu Cys Pro Val Asn Ala Gly Ala Ala Pro Asn Leu Gly Ser Glu Leu
        115                 120                 125

ctc gcc gcc ggt tac aca ttc gcc ggc tac gcc gag ggc ctg ccg tcc      432
Leu Ala Ala Gly Tyr Thr Phe Ala Gly Tyr Ala Glu Gly Leu Pro Ser
    130                 135                 140

ccg ggc tca ccg gtg tgc agt gcg ggc aag tac gcg cga aaa cat gtg      480
Pro Gly Ser Pro Val Cys Ser Ala Gly Lys Tyr Ala Arg Lys His Val
145                 150                 155                 160

ccg tgg gcc aac ttc acc aac gtg ccg gcg gcg agc tcg ctg ccg ttc      528
Pro Trp Ala Asn Phe Thr Asn Val Pro Ala Ala Ser Ser Leu Pro Phe
                165                 170                 175

tcg gcg ttc ccg atg ggc aac tac gcc agc ctg ccg acg gtg tcg ttc      576
Ser Ala Phe Pro Met Gly Asn Tyr Ala Ser Leu Pro Thr Val Ser Phe
            180                 185                 190

gtc atc ccg aac aac gac aac aac atg cac gac ggc tcg atc gcg cag      624
Val Ile Pro Asn Asn Asp Asn Asn Met His Asp Gly Ser Ile Ala Gln
        195                 200                 205

gcc gac gcc tgg ctg aac cgg cag ctg tcc ggc tac gcc aat tgg gcg      672
Ala Asp Ala Trp Leu Asn Arg Gln Leu Ser Gly Tyr Ala Asn Trp Ala
    210                 215                 220

ctg gcc aac aac agc ctg ctg atc gtc acc ttc gac gag gac gac aac      720
Leu Ala Asn Asn Ser Leu Leu Ile Val Thr Phe Asp Glu Asp Asp Asn
225                 230                 235                 240

tcc aac gtc gga gcc agc cgc aac cag atc ccc acg gtg ttc tac ggc      768
Ser Asn Val Gly Ala Ser Arg Asn Gln Ile Pro Thr Val Phe Tyr Gly
                245                 250                 255

gcc cac gtc cgc ccc ggc aac tac gcc gag cag atc aac cac tac aac      816
Ala His Val Arg Pro Gly Asn Tyr Ala Glu Gln Ile Asn His Tyr Asn
            260                 265                 270

gtg ctt gcc acc ctc gag cag atg tac ggg ctg ccc aag acg ggc tat      864
Val Leu Ala Thr Leu Glu Gln Met Tyr Gly Leu Pro Lys Thr Gly Tyr
        275                 280                 285

gcc gcc ggc gcc gcc ccc atc acc gac atc tgg ggc tga                  903
Ala Ala Gly Ala Ala Pro Ile Thr Asp Ile Trp Gly
    290                 295                 300
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<210> 14

<211> 300

<212> PRT

<213> Mycobacterium avium

<400> 14

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Met Ser Arg Glu Asn Arg Ser Arg Arg Arg Leu Ile Gly Gly Ala Tyr
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Arg Ser Leu Arg Leu Leu Gly Ala Val Ala Ala Val Ala Leu Ala Ala
            20                  25                  30

Ser Pro Leu Thr Pro Arg Thr Ser Leu Ala Ala Ala Ala Ile Pro Gln
        35                  40                  45

Pro Ser His Ile Val Ile Val Val Glu Glu Asn Arg Ser Glu Ser Gly
    50                  55                  60

Ile Ile Gly Asn Lys Ser Ala Pro Phe Ile Thr Ala Leu Ala Ala Ser
65                  70                  75                  80

Gly Ala Asn Met Thr Gln Ser Phe Ala Glu Thr His Pro Ser Glu Pro
                85                  90                  95

Asn Tyr Leu Ala Leu Phe Ala Gly Asn Thr Phe Gly Val Thr Lys Asp
            100                 105                 110

Leu Cys Pro Val Asn Ala Gly Ala Ala Pro Asn Leu Gly Ser Glu Leu
        115                 120                 125

Leu Ala Ala Gly Tyr Thr Phe Ala Gly Tyr Ala Glu Gly Leu Pro Ser
    130                 135                 140

Pro Gly Ser Pro Val Cys Ser Ala Gly Lys Tyr Ala Arg Lys His Val
145                 150                 155                 160

Pro Trp Ala Asn Phe Thr Asn Val Pro Ala Ala Ser Ser Leu Pro Phe
                165                 170                 175

Ser Ala Phe Pro Met Gly Asn Tyr Ala Ser Leu Pro Thr Val Ser Phe
            180                 185                 190

Val Ile Pro Asn Asn Asp Asn Asn Met His Asp Gly Ser Ile Ala Gln
        195                 200                 205

Ala Asp Ala Trp Leu Asn Arg Gln Leu Ser Gly Tyr Ala Asn Trp Ala
    210                 215                 220
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```
Leu Ala Asn Asn Ser Leu Leu Ile Val Thr Phe Asp Glu Asp Asp Asn
225                 230                 235                 240

Ser Asn Val Gly Ala Ser Arg Asn Gln Ile Pro Thr Val Phe Tyr Gly
                245                 250                 255

Ala His Val Arg Pro Gly Asn Tyr Ala Glu Gln Ile Asn His Tyr Asn
            260                 265                 270

Val Leu Ala Thr Leu Glu Gln Met Tyr Gly Leu Pro Lys Thr Gly Tyr
        275                 280                 285

Ala Ala Gly Ala Ala Pro Ile Thr Asp Ile Trp Gly
    290                 295                 300
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<210> 15

<211> 888

<212> DNA

<213> Mycobacterium marinum

<220>

<221> CDS

<222> (1)..(888)

<400> 15

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gtg tgt ggc ctg aaa cag cgt ttt acc agt aca ttt cga gct ctg gcg        48
Met Cys Gly Leu Lys Gln Arg Phe Thr Ser Thr Phe Arg Ala Leu Ala
1               5                   10                  15

gta ctc ggc gcg gtg gcg gta tcc cta ccg gcc cac ggt agc gac gct        96
Val Leu Gly Ala Val Ala Val Ser Leu Pro Ala His Gly Ser Asp Ala
            20                  25                  30

ccc ccg cgt atc gac ctg acc gcc act gcg ttg ccg gcg ttc tca cat       144
Pro Pro Arg Ile Asp Leu Thr Ala Thr Ala Leu Pro Ala Phe Ser His
        35                  40                  45

gtg gtg gtc gtg gtg gag gag aac cat tcg cag gcc aac atc att ggc       192
Val Val Val Val Val Glu Glu Asn His Ser Gln Ala Asn Ile Ile Gly
    50                  55                  60

aac aag gcg gcc ccg ttc atc aat gcg ctg gcc gcc aat ggc gcg atg       240
Asn Lys Ala Ala Pro Phe Ile Asn Ala Leu Ala Ala Asn Gly Ala Met
65                  70                  75                  80

atg tcg cag tcg ttc gcc gaa acg cac ccc agc gaa ccc aac tac ctg       288
Met Ser Gln Ser Phe Ala Glu Thr His Pro Ser Glu Pro Asn Tyr Leu
                85                  90                  95

gcc ttg ttc gcc ggt acc acc ttc ggc ttg aag aag aac acg tgt ccg       336
Ala Leu Phe Ala Gly Thr Thr Phe Gly Leu Lys Lys Asn Thr Cys Pro
            100                 105                 110

gtc aat gcg ggc agc acg ccc aac ctg gct tcg gag ttg ctc gcc gcg       384
Val Asn Ala Gly Ser Thr Pro Asn Leu Ala Ser Glu Leu Leu Ala Ala
```

```
        115                 120                 125

ggc cac acg ttc gta ggt ttc gcc gag agc ctg ccc gaa gtc ggt tcg      432
Gly His Thr Phe Val Gly Phe Ala Glu Ser Leu Pro Glu Val Gly Ser
    130                 135                 140

acg gtc tgc agc gcc gga aag tac ggg cgc aag cat gcg cct tgg gtg      480
Thr Val Cys Ser Ala Gly Lys Tyr Gly Arg Lys His Ala Pro Trp Val
145                 150                 155                 160

aac ttc agc aat gtt ccg gcc acg ctg tcg atg ccc ttc tcc gcg ttt      528
Asn Phe Ser Asn Val Pro Ala Thr Leu Ser Met Pro Phe Ser Ala Phe
                165                 170                 175

ccg acg ccg gcg gac tac gcc agg ctg ccc acg gtg tcc ttc gtc atc      576
Pro Thr Pro Ala Asp Tyr Ala Arg Leu Pro Thr Val Ser Phe Val Ile
            180                 185                 190

ccc aac ggg gat aac aac atg cac gac ggc acc atc gcg gca gct gac      624
Pro Asn Gly Asp Asn Asn Met His Asp Gly Thr Ile Ala Ala Ala Asp
        195                 200                 205

gag tgg ttg aac cgt caa ctg tcg ccg tac gcc aac tgg gcc cga tcc      672
Glu Trp Leu Asn Arg Gln Leu Ser Pro Tyr Ala Asn Trp Ala Arg Ser
    210                 215                 220

aac aac agc ctg ctg atc gtg acg tgg gat gag gac gac ggc ggc agc      720
Asn Asn Ser Leu Leu Ile Val Thr Trp Asp Glu Asp Asp Gly Gly Ser
225                 230                 235                 240

cgc aac cag att ccc acg gtg ttc tac ggc gca cac gta cgg ccg ggc      768
Arg Asn Gln Ile Pro Thr Val Phe Tyr Gly Ala His Val Arg Pro Gly
                245                 250                 255

act tac aac cag acc atc agc cac tac aac gtg ctt tcc acg ctg gag      816
Thr Tyr Asn Gln Thr Ile Ser His Tyr Asn Val Leu Ser Thr Leu Glu
            260                 265                 270

cag atg tac ggc ttg ccc aag acg ggt ttc gcg gcg aac gcc ccg gtc      864
Gln Met Tyr Gly Leu Pro Lys Thr Gly Phe Ala Ala Asn Ala Pro Val
        275                 280                 285

atc gct gat atc tgg ggc ggc taa                                     888
Ile Ala Asp Ile Trp Gly Gly
    290                 295
```

<210> 16

<211> 295

<212> PRT

<213> Mycobacterium marinum

<400> 16

```
Met Cys Gly Leu Lys Gln Arg Phe Thr Ser Thr Phe Arg Ala Leu Ala
1               5                   10                  15

Val Leu Gly Ala Val Ala Val Ser Leu Pro Ala His Gly Ser Asp Ala
            20                  25                  30

Pro Pro Arg Ile Asp Leu Thr Ala Thr Ala Leu Pro Ala Phe Ser His
```

35 40 45

Val Val Val Val Val Glu Glu Asn His Ser Gln Ala Asn Ile Ile Gly
50 55 60

Asn Lys Ala Ala Pro Phe Ile Asn Ala Leu Ala Ala Asn Gly Ala Met
65 70 75 80

Met Ser Gln Ser Phe Ala Glu Thr His Pro Ser Glu Pro Asn Tyr Leu
85 90 95

Ala Leu Phe Ala Gly Thr Thr Phe Gly Leu Lys Lys Asn Thr Cys Pro
100 105 110

Val Asn Ala Gly Ser Thr Pro Asn Leu Ala Ser Glu Leu Leu Ala Ala
115 120 125

Gly His Thr Phe Val Gly Phe Ala Glu Ser Leu Pro Glu Val Gly Ser
130 135 140

Thr Val Cys Ser Ala Gly Lys Tyr Gly Arg Lys His Ala Pro Trp Val
145 150 155 160

Asn Phe Ser Asn Val Pro Ala Thr Leu Ser Met Pro Phe Ser Ala Phe
165 170 175

Pro Thr Pro Ala Asp Tyr Ala Arg Leu Pro Thr Val Ser Phe Val Ile
180 185 190

Pro Asn Gly Asp Asn Asn Met His Asp Gly Thr Ile Ala Ala Ala Asp
195 200 205

Glu Trp Leu Asn Arg Gln Leu Ser Pro Tyr Ala Asn Trp Ala Arg Ser
210 215 220

Asn Asn Ser Leu Leu Ile Val Thr Trp Asp Glu Asp Asp Gly Gly Ser
225 230 235 240

Arg Asn Gln Ile Pro Thr Val Phe Tyr Gly Ala His Val Arg Pro Gly
245 250 255

Thr Tyr Asn Gln Thr Ile Ser His Tyr Asn Val Leu Ser Thr Leu Glu
260 265 270

Gln Met Tyr Gly Leu Pro Lys Thr Gly Phe Ala Ala Asn Ala Pro Val
275 280 285

Ile Ala Asp Ile Trp Gly Gly
290 295

<210> 17

<211> 1291

<212> DNA

<213> Penicillium chrysogenum

<220>

<221> CDS

<222> (1)..(213)

<220>

<221> intro

<222> (217)..(244)

<220>

<221> CDS

<222> (245)..(1288)

<400> 17

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atg ctc acc aaa caa acc ctt ctc gcg ttc gtc ggg gcc ctc gcc ctc       48
Met Leu Thr Lys Gln Thr Leu Leu Ala Phe Val Gly Ala Leu Ala Leu
1               5                  10                  15

gcc acg ggt aca act acc act gaa gag acc cca act cag gct gag att       96
Ala Thr Gly Thr Thr Thr Thr Glu Glu Thr Pro Thr Gln Ala Glu Ile
            20                  25                  30

gat gca gca cgt gct acg gcc ctg cct tac tct cct gtg tca aac gta      144
Asp Ala Ala Arg Ala Thr Ala Leu Pro Tyr Ser Pro Val Ser Asn Val
        35                  40                  45

aag ggt ttg gcc ttt gat cgt ttc gtg aac atc tgg ctc gag aac aca      192
Lys Gly Leu Ala Phe Asp Arg Phe Val Asn Ile Trp Leu Glu Asn Thr
    50                  55                  60

gta ggt ttc ccg ttg aat ata taacaatgac cacgcgctca ccccttttgta g      244
Val Gly Phe Pro Leu Asn Ile
65                  70

gac ttt gaa ccc gct gct tta gac gag aac ctg tcc aag ctg gcc aag      292
Asp Phe Glu Pro Ala Ala Leu Asp Glu Asn Leu Ser Lys Leu Ala Lys
            75                  80                  85

gag ggt atc ctc ctg acc aac tac ttt gcc atc tct cac ccc tcg cag      340
Glu Gly Ile Leu Leu Thr Asn Tyr Phe Ala Ile Ser His Pro Ser Gln
        90                  95                  100

ccc aac tac tgt gct tcc gcc ggg ggt gac aca ttc ggc atg gat aat      388
Pro Asn Tyr Cys Ala Ser Ala Gly Gly Asp Thr Phe Gly Met Asp Asn
    105                 110                 115

gac gac ttc cta caa atc cct tcg aat gtc tca act att gcc gat ctc      436
Asp Asp Phe Leu Gln Ile Pro Ser Asn Val Ser Thr Ile Ala Asp Leu
```

```
120                 125                 130                 135

ttt gat act aag cac atc tct tgg ggt gaa tac caa gaa gac atg ccc      484
Phe Asp Thr Lys His Ile Ser Trp Gly Glu Tyr Gln Glu Asp Met Pro
                140                 145                 150

tat gct ggc tac caa ggc aaa cgg tat ccc ctc agc ggt ccg aac cag      532
Tyr Ala Gly Tyr Gln Gly Lys Arg Tyr Pro Leu Ser Gly Pro Asn Gln
            155                 160                 165

tac gtg cgc aag cac aac ccg ctg gtt ttg ttt aac tcg gtt acc gac      580
Tyr Val Arg Lys His Asn Pro Leu Val Leu Phe Asn Ser Val Thr Asp
        170                 175                 180

gac gcc gtg cgc ccg cgc caa atc aag aat ttc acc act ttc tac gac      628
Asp Ala Val Arg Pro Arg Gln Ile Lys Asn Phe Thr Thr Phe Tyr Asp
    185                 190                 195

gat ctg aag cac cac agc ctt ccc caa cac atg ttc atc aca ccg aac      676
Asp Leu Lys His His Ser Leu Pro Gln His Met Phe Ile Thr Pro Asn
200                 205                 210                 215

atg acc aat gac gcc cac gac acg aac atc act gtg gcc ggt aac tgg      724
Met Thr Asn Asp Ala His Asp Thr Asn Ile Thr Val Ala Gly Asn Trp
                220                 225                 230

gtc gat cgc ttc ctg tct cct cta ctg aag aac gag tac ttc acc aag      772
Val Asp Arg Phe Leu Ser Pro Leu Leu Lys Asn Glu Tyr Phe Thr Lys
            235                 240                 245

gac agc cta gtg cta ctc acc ttt gac gag gga gac acc tac tcc tac      820
Asp Ser Leu Val Leu Leu Thr Phe Asp Glu Gly Asp Thr Tyr Ser Tyr
        250                 255                 260

ccc aac cgg gtc ttc agc ttc ctt gtt gga ggt gct atc cca gag cac      868
Pro Asn Arg Val Phe Ser Phe Leu Val Gly Gly Ala Ile Pro Glu His
    265                 270                 275

ctg aag ggg acc act gac gac act ttc tac acc cac tac tca att gtc      916
Leu Lys Gly Thr Thr Asp Asp Thr Phe Tyr Thr His Tyr Ser Ile Val
280                 285                 290                 295

gct tcc ctg tct gct aac tgg ggt tta ccc tcg ctt ggt cgc tgg gat      964
Ala Ser Leu Ser Ala Asn Trp Gly Leu Pro Ser Leu Gly Arg Trp Asp
                300                 305                 310

tgt ggc gcc aac ctg ctg aag atg gtc gct gac aag acc ggc tat gtc     1012
Cys Gly Ala Asn Leu Leu Lys Met Val Ala Asp Lys Thr Gly Tyr Val
            315                 320                 325

aac tgg gaa gtt gat acc agc aat gtc tac ctc aac gag act tac cct     1060
Asn Trp Glu Val Asp Thr Ser Asn Val Tyr Leu Asn Glu Thr Tyr Pro
        330                 335                 340

gga cct atg tct acc gac aac tat tcc tct aag tgg gcc gtt cct gcc     1108
Gly Pro Met Ser Thr Asp Asn Tyr Ser Ser Lys Trp Ala Val Pro Ala
    345                 350                 355

acc aag ggc aaa tgc tct gct ggc cat ggc att gct gag gtc gtg aag     1156
Thr Lys Gly Lys Cys Ser Ala Gly His Gly Ile Ala Glu Val Val Lys
360                 365                 370                 375

aat acc tac cac ggg ctt caa ccc acc tac gac tat gcc agc cct gta     1204
Asn Thr Tyr His Gly Leu Gln Pro Thr Tyr Asp Tyr Ala Ser Pro Val
                380                 385                 390

ccg tat gac gtg acc agt gga aac aac gtc ggc atc aag tac cac cgc     1252
Pro Tyr Asp Val Thr Ser Gly Asn Asn Val Gly Ile Lys Tyr His Arg
```

395 400 405

act ctg gta tgt atc ctt tca tgt tct tcc ctt tca tga 1291
Thr Leu Val Cys Ile Leu Ser Cys Ser Ser Leu Ser
410 415

<210> 18

<211> 71

<212> PRT

<213> Penicillium chrysogenum

<400> 18

Met Leu Thr Lys Gln Thr Leu Leu Ala Phe Val Gly Ala Leu Ala Leu
1 5 10 15

Ala Thr Gly Thr Thr Thr Thr Glu Glu Thr Pro Thr Gln Ala Glu Ile
20 25 30

Asp Ala Ala Arg Ala Thr Ala Leu Pro Tyr Ser Pro Val Ser Asn Val
35 40 45

Lys Gly Leu Ala Phe Asp Arg Phe Val Asn Ile Trp Leu Glu Asn Thr
50 55 60

Val Gly Phe Pro Leu Asn Ile
65 70

<210> 19

<211> 348

<212> PRT

<213> Penicillium chrysogenum

<400> 19

Asp Phe Glu Pro Ala Ala Leu Asp Glu Asn Leu Ser Lys Leu Ala Lys
1 5 10 15

Glu Gly Ile Leu Leu Thr Asn Tyr Phe Ala Ile Ser His Pro Ser Gln
20 25 30

Pro Asn Tyr Cys Ala Ser Ala Gly Gly Asp Thr Phe Gly Met Asp Asn
35 40 45

Asp Asp Phe Leu Gln Ile Pro Ser Asn Val Ser Thr Ile Ala Asp Leu
50 55 60

Phe Asp Thr Lys His Ile Ser Trp Gly Glu Tyr Gln Glu Asp Met Pro

65 70 75 80

Tyr Ala Gly Tyr Gln Gly Lys Arg Tyr Pro Leu Ser Gly Pro Asn Gln
85 90 95

Tyr Val Arg Lys His Asn Pro Leu Val Leu Phe Asn Ser Val Thr Asp
100 105 110

Asp Ala Val Arg Pro Arg Gln Ile Lys Asn Phe Thr Thr Phe Tyr Asp
115 120 125

Asp Leu Lys His His Ser Leu Pro Gln His Met Phe Ile Thr Pro Asn
130 135 140

Met Thr Asn Asp Ala His Asp Thr Asn Ile Thr Val Ala Gly Asn Trp
145 150 155 160

Val Asp Arg Phe Leu Ser Pro Leu Leu Lys Asn Glu Tyr Phe Thr Lys
165 170 175

Asp Ser Leu Val Leu Leu Thr Phe Asp Glu Gly Asp Thr Tyr Ser Tyr
180 185 190

Pro Asn Arg Val Phe Ser Phe Leu Val Gly Gly Ala Ile Pro Glu His
195 200 205

Leu Lys Gly Thr Thr Asp Asp Thr Phe Tyr Thr His Tyr Ser Ile Val
210 215 220

Ala Ser Leu Ser Ala Asn Trp Gly Leu Pro Ser Leu Gly Arg Trp Asp
225 230 235 240

Cys Gly Ala Asn Leu Leu Lys Met Val Ala Asp Lys Thr Gly Tyr Val
245 250 255

Asn Trp Glu Val Asp Thr Ser Asn Val Tyr Leu Asn Glu Thr Tyr Pro
260 265 270

Gly Pro Met Ser Thr Asp Asn Tyr Ser Ser Lys Trp Ala Val Pro Ala
275 280 285

Thr Lys Gly Lys Cys Ser Ala Gly His Gly Ile Ala Glu Val Val Lys
290 295 300

Asn Thr Tyr His Gly Leu Gln Pro Thr Tyr Asp Tyr Ala Ser Pro Val
305 310 315 320

Pro Tyr Asp Val Thr Ser Gly Asn Asn Val Gly Ile Lys Tyr His Arg
325 330 335

Thr Leu Val Cys Ile Leu Ser Cys Ser Ser Leu Ser

340 345

<210> 20

<211> 1457

<212> DNA

<213> Aspergillus fumigatus

<220>

<221> CDS

<222> (1)..(186)

<220>

<221> Intron

<222> (187)..(239)

<220>

<221> CDS

<222> (240)..(301)

<220>

<221> Intron

<222> (302)..(361)

<220>

<221> CDS

<222> (362)..(1454)

<400> 20

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atg aag cct tcc gtc gcg act ttg ctt gcc act gtc tct ctg gtc tat       48
Met Lys Pro Ser Val Ala Thr Leu Leu Ala Thr Val Ser Leu Val Tyr
1               5                  10                  15

gct cag act gct act gag aag gag cct tcg ctg tct gcg ata gaa tct       96
Ala Gln Thr Ala Thr Glu Lys Glu Pro Ser Leu Ser Ala Ile Glu Ser
            20                  25                  30

gca gca gcc tcc atc cag cct tac tct ccc gtt tcg aac gtt gag ggt      144
Ala Ala Ala Ser Ile Gln Pro Tyr Ser Pro Val Ser Asn Val Glu Gly
        35                  40                  45

gtt gca ttt aat cgc ttc ttc caa gtg tgg ctt gag aat att              186
Val Ala Phe Asn Arg Phe Phe Gln Val Trp Leu Glu Asn Ile
```

```
    50                  55                  60

gtatgtgatc accttaccaa tcagagaatc ttgttcaaag ctgacctcag aag gat      242
                                                          Asp

tac gag gat gct gcg gcg gat gag aac atg aaa tgg ctg gcc tcg caa      290
Tyr Glu Asp Ala Ala Ala Asp Glu Asn Met Lys Trp Leu Ala Ser Gln
    65                  70                  75

ggg atc ctg ct  gtaagacctc atatcggcca tctgctcacg atttgaactt          341
Gly Ile Leu Leu
80

cgaactaatt tactccacag c acc aat ttc tat gca gtc acg cat cct tca      392
                       Thr Asn Phe Tyr Ala Val Thr His Pro Ser
                           85                  90

gag cca aac tac tgc gct gct gtt gga ggc gac aca ttt ggc atg gac      440
Glu Pro Asn Tyr Cys Ala Ala Val Gly Gly Asp Thr Phe Gly Met Asp
    95                  100                 105

aat gac aac ttt aac cag att cct gcc aat gtt tct act gtc gct gat      488
Asn Asp Asn Phe Asn Gln Ile Pro Ala Asn Val Ser Thr Val Ala Asp
110                 115                 120                 125

ctc ctg gac acc aaa aac att gct tgg gga gag tat cag gag cac tta      536
Leu Leu Asp Thr Lys Asn Ile Ala Trp Gly Glu Tyr Gln Glu His Leu
                130                 135                 140

cct tat ccc gga ttc caa ggt ttc aac tat tcc aac cag gag act tat      584
Pro Tyr Pro Gly Phe Gln Gly Phe Asn Tyr Ser Asn Gln Glu Thr Tyr
            145                 150                 155

gtc aat gac tat gtg cgc aag cat aac cca ctg gtc ttg tat gac tct      632
Val Asn Asp Tyr Val Arg Lys His Asn Pro Leu Val Leu Tyr Asp Ser
        160                 165                 170

gtc acc aag aac agc act cgt ttg cgc cag atc aag aac ttt acc agc      680
Val Thr Lys Asn Ser Thr Arg Leu Arg Gln Ile Lys Asn Phe Thr Ser
    175                 180                 185

ttc gag gac gac ctg gcc aac aag aaa ctt cct caa tgg gca ttt atc      728
Phe Glu Asp Asp Leu Ala Asn Lys Lys Leu Pro Gln Trp Ala Phe Ile
190                 195                 200                 205

act cca aac atg acc aac gac gct cat gac acc aac att act ttc gga      776
Thr Pro Asn Met Thr Asn Asp Ala His Asp Thr Asn Ile Thr Phe Gly
                210                 215                 220

gcc aaa tgg gag cga agc tgg att gcg ccc ttg ctc aac aac tca tac      824
Ala Lys Trp Glu Arg Ser Trp Ile Ala Pro Leu Leu Asn Asn Ser Tyr
            225                 230                 235

ttc atg aat gat acc cta atc cta ctt acc ttt gat gag gat ggc act      872
Phe Met Asn Asp Thr Leu Ile Leu Leu Thr Phe Asp Glu Asp Gly Thr
        240                 245                 250

tat tcc aag agc aac aag atc ttc agt gtt ctt ctc ggt ggt gcc att      920
Tyr Ser Lys Ser Asn Lys Ile Phe Ser Val Leu Leu Gly Gly Ala Ile
    255                 260                 265

ccc gat gag ctg aag ggt act cag gac gat acg ttc tat acc cac tac      968
Pro Asp Glu Leu Lys Gly Thr Gln Asp Asp Thr Phe Tyr Thr His Tyr
270                 275                 280                 285

tca gtg att gcg tcc gtg tcc gcg aac tgg ggc ctt cct tcg ttg gga     1016
Ser Val Ile Ala Ser Val Ser Ala Asn Trp Gly Leu Pro Ser Leu Gly
```

```
                290                 295                 300

agg tgg gat tgt ggt gcg aac att ctt gag att gtg gca aac aag acg      1064
Arg Trp Asp Cys Gly Ala Asn Ile Leu Glu Ile Val Ala Asn Lys Thr
            305                 310                 315

gga tat gtc aac tac gac gtt gac aca acc aat ctc cgc ctc aac gag      1112
Gly Tyr Val Asn Tyr Asp Val Asp Thr Thr Asn Leu Arg Leu Asn Glu
        320                 325                 330

acc tac ccc ggt ccc atg tca gcg ggc gaa tac tcg aaa tac tcc cct      1160
Thr Tyr Pro Gly Pro Met Ser Ala Gly Glu Tyr Ser Lys Tyr Ser Pro
    335                 340                 345

gtc tgg ccg aat gcc ttg acc cgt ggt gac tgc tct gct ggc cat ggc      1208
Val Trp Pro Asn Ala Leu Thr Arg Gly Asp Cys Ser Ala Gly His Gly
350                 355                 360                 365

att ttg gac att gtc aag gag acc tac gcc aac acg gag cca aca tac      1256
Ile Leu Asp Ile Val Lys Glu Thr Tyr Ala Asn Thr Glu Pro Thr Tyr
                370                 375                 380

aac tat tcg agc ccc ttc cca tat gac act gcg agc aac tac aac acc      1304
Asn Tyr Ser Ser Pro Phe Pro Tyr Asp Thr Ala Ser Asn Tyr Asn Thr
            385                 390                 395

aag gtg act gcc acc aaa aag aat gtc acc ggt aca cat aga agt tct      1352
Lys Val Thr Ala Thr Lys Lys Asn Val Thr Gly Thr His Arg Ser Ser
        400                 405                 410

tct tcc tcc tct ccg tca gct agc tcc aac gcc gct gtt tct gct gtc      1400
Ser Ser Ser Ser Pro Ser Ala Ser Ser Asn Ala Ala Val Ser Ala Val
    415                 420                 425

gct cct gca gcc ggt gtc tct ggt ctc ctc ttg gga ctc gct cta aac      1448
Ala Pro Ala Ala Gly Val Ser Gly Leu Leu Leu Gly Leu Ala Leu Asn
430                 435                 440                 445

ctg ctt taa                                                         1457
Leu Leu
```

<210> 21

<211> 447

<212> PRT

<213> Aspergillus fumigatus

<400> 21

```
Met Lys Pro Ser Val Ala Thr Leu Leu Ala Thr Val Ser Leu Val Tyr
1               5                   10                  15

Ala Gln Thr Ala Thr Glu Lys Glu Pro Ser Leu Ser Ala Ile Glu Ser
            20                  25                  30

Ala Ala Ala Ser Ile Gln Pro Tyr Ser Pro Val Ser Asn Val Glu Gly
        35                  40                  45
```

```
Val Ala Phe Asn Arg Phe Phe Gln Val Trp Leu Glu Asn Ile Asp Tyr
    50                  55                  60

Glu Asp Ala Ala Ala Asp Glu Asn Met Lys Trp Leu Ala Ser Gln Gly
65                  70                  75                  80

Ile Leu Leu Thr Asn Phe Tyr Ala Val Thr His Pro Ser Glu Pro Asn
                85                  90                  95

Tyr Cys Ala Ala Val Gly Gly Asp Thr Phe Gly Met Asp Asn Asp Asn
            100                 105                 110

Phe Asn Gln Ile Pro Ala Asn Val Ser Thr Val Ala Asp Leu Leu Asp
        115                 120                 125

Thr Lys Asn Ile Ala Trp Gly Glu Tyr Gln Glu His Leu Pro Tyr Pro
    130                 135                 140

Gly Phe Gln Gly Phe Asn Tyr Ser Asn Gln Glu Thr Tyr Val Asn Asp
145                 150                 155                 160

Tyr Val Arg Lys His Asn Pro Leu Val Leu Tyr Asp Ser Val Thr Lys
                165                 170                 175

Asn Ser Thr Arg Leu Arg Gln Ile Lys Asn Phe Thr Ser Phe Glu Asp
            180                 185                 190

Asp Leu Ala Asn Lys Lys Leu Pro Gln Trp Ala Phe Ile Thr Pro Asn
        195                 200                 205

Met Thr Asn Asp Ala His Asp Thr Asn Ile Thr Phe Gly Ala Lys Trp
    210                 215                 220

Glu Arg Ser Trp Ile Ala Pro Leu Leu Asn Asn Ser Tyr Phe Met Asn
225                 230                 235                 240

Asp Thr Leu Ile Leu Leu Thr Phe Asp Glu Asp Gly Thr Tyr Ser Lys
                245                 250                 255

Ser Asn Lys Ile Phe Ser Val Leu Leu Gly Gly Ala Ile Pro Asp Glu
            260                 265                 270

Leu Lys Gly Thr Gln Asp Asp Thr Phe Tyr Thr His Tyr Ser Val Ile
        275                 280                 285

Ala Ser Val Ser Ala Asn Trp Gly Leu Pro Ser Leu Gly Arg Trp Asp
    290                 295                 300

Cys Gly Ala Asn Ile Leu Glu Ile Val Ala Asn Lys Thr Gly Tyr Val
305                 310                 315                 320
```

```
Asn Tyr Asp Val Asp Thr Thr Asn Leu Arg Leu Asn Glu Thr Tyr Pro
                325                 330                 335

Gly Pro Met Ser Ala Gly Glu Tyr Ser Lys Tyr Ser Pro Val Trp Pro
            340                 345                 350

Asn Ala Leu Thr Arg Gly Asp Cys Ser Ala Gly His Gly Ile Leu Asp
        355                 360                 365

Ile Val Lys Glu Thr Tyr Ala Asn Thr Glu Pro Thr Tyr Asn Tyr Ser
    370                 375                 380

Ser Pro Phe Pro Tyr Asp Thr Ala Ser Asn Tyr Asn Thr Lys Val Thr
385                 390                 395                 400

Ala Thr Lys Lys Asn Val Thr Gly Thr His Arg Ser Ser Ser Ser Ser
                405                 410                 415

Ser Pro Ser Ala Ser Ser Asn Ala Ala Val Ser Ala Val Ala Pro Ala
            420                 425                 430

Ala Gly Val Ser Gly Leu Leu Leu Gly Leu Ala Leu Asn Leu Leu
        435                 440                 445
```

<210> 22

<211> 8

<212> PRT

<213> Mycobacterium tuberculosis

<400> 22

```
Asn Asp Met His Asp Gly Ser Ile
1               5
```